Nuclear Energy Research Initiative (NERI)

Office of Nuclear Energy, Science and Technology
U. S. Department of Energy

March 2003

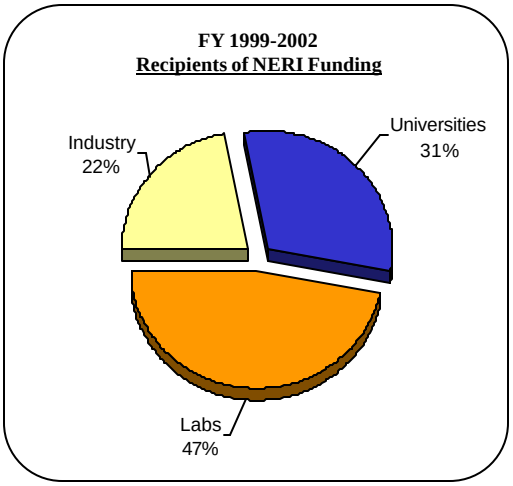
Background

In January 1997 the President tasked his Committee of Advisors on Science and Technology (PCAST) to evaluate the current national energy research and development (R&D) portfolio and provide a strategy to ensure the U.S. has a program to address the nation's energy and environmental needs for the next century.

In its November 1997 report, the PCAST Panel on Energy Research and Development determined that it was important to establish nuclear energy as a viable and expandable option and that a properly focused R&D effort to address the potential long-term barriers to expanded use of nuclear power was appropriate. The PCAST panel further recommended that the Department of Energy (DOE) reinvigorate its nuclear energy R&D activities in order to address these potential barriers with a new Nuclear Energy Research Initiative (NERI).

The Department and Congress endorsed the PCAST recommendations and received Congressional appropriations in fiscal year (FY) 1999 to sponsor innovative scientific and engineering R&D to address the key issues affecting the future use of nuclear energy and to preserve the nation's science and technology leadership.

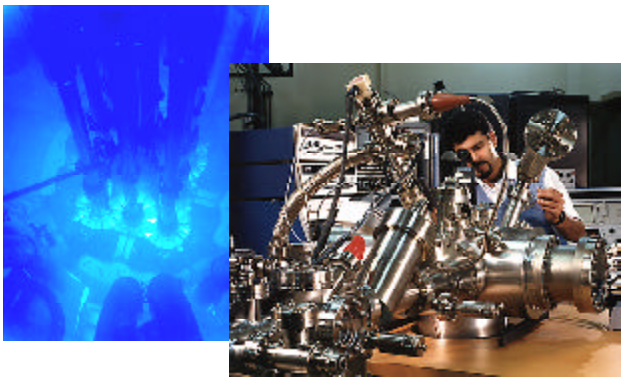
The *National Energy Policy* (NEP), issued in May 2001 by the Vice President's National Energy Policy Development Group, supports the expansion of nuclear energy as a major component of the national energy policy to meet the growing energy requirements of the United States. The NEP forms the core element in the planning for DOE's nuclear energy research programs addressing, among other areas, the research and development of advanced reactor and fuel cycle concepts and the associated enabling sciences and technologies. In FY 2002, NERI broadened its focus to include the specific nuclear research areas noted in the NEP.



To achieve these long-range goals, the NERI program has the following objectives:

- Develop advanced concepts and scientific breakthroughs in nuclear fission and reactor technology to address and overcome the principal technical obstacles to the expanded use of nuclear energy: economics, proliferation and waste management;
- Advance the state of nuclear technology in the United States to maintain a competitive position in overseas markets and a future domestic market; and
- Promote and maintain a nuclear science and engineering infrastructure to meet future technical challenges.

NERI features a competitive, peer-reviewed R&D selection process to fund researcher-initiated R&D proposals from universities, national laboratories and industry.



Research Areas

The NERI program conducts innovative scientific and engineering research and development in areas such as:

- Small Reactor Concepts
- Alternative Power Conversion Cycles
- Cogeneration Applications
- Hydrogen Generation
- Generation IV Enabling Technologies
- Advanced Instrumentation and Controls
- Automation Technologies
- Advanced Structural Materials
- Corrosion-Resistant Fuel Cladding
- Enhanced Coolant Chemistry
- High Burnup Proliferation-Resistant Fuels
- Generation IV Fuel Designs
- Advanced Fuel Cycle Development

Nuclear Energy Research Advisory Committee

To help guide the Department's nuclear R&D and shape the future direction of the nuclear technology program, in November 1998, the Secretary of Energy established an independent advisory committee, the Nuclear Energy Research Advisory Committee (NERAC). NERAC chartered subcommittees have developed a series of important reports and plans to guide the Department's activities. These include the *Long-Term Nuclear and Technology Research and Development Plan* issued in June 2000, the *Technical Opportunities to Increase the Proliferation Resistance of Global Civilian Nuclear Power Systems* (TOPS) Report issued in January 2001, and *A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010* issued in October 2001. A *Technology Roadmap for Generation IV Nuclear Energy Systems* is being completed and will be submitted to Congress by March 2003. Their efforts will help guide NERI and other Federal nuclear energy research.

Major Program Accomplishments (FY 1999-2002)

- In the first 4 years of the program, NERI awarded 93 investigator initiated, peer reviewed, merit selected research projects in nuclear science and technology representing over $110 million in research for the three-year cycle projects.
- The 93 NERI projects fund research at 68 U.S. research organizations including 27 universities, 11 national laboratories, 28 industrial organizations, and 2 government agencies.
- NERI has stimulated significant international interest in U.S. nuclear research with the collaborative involvement of 29 international R&D organizations in the current NERI projects at no cost to the Federal government.
- The International Nuclear Energy Research Initiative (I-NERI) was established in FY 2001 to conduct bilateral research to improve the cost and enhance the safety, nonproliferation and waste management of future nuclear energy systems.
- In FY 2002, NERI completed 23 of the projects awarded in FY 1999.

FY 2003 Planned Accomplishments:

- Complete the remaining 23 projects initiated in FY 1999, and 6 of the projects initiated in FY 2000.
- Continue the 4 projects initiated in FY 2000, 13 projects initiated in FY 2001, and the 24 projects initiated in FY 2002.

FY 2004 Planned Accomplishments:

- Complete 4 of the projects initiated in FY 2000, and 7 of the projects initated in FY 2001.
- Continue 24 projects initiated in FY 2002.

	Number of New Awards			
Research Areas	FY 1999	FY 2000	FY 2001	FY 2002
New Reactor Designs and Technologies	20	8	7	12
Advanced Nuclear Fuel	8	1	1	6
Nuclear Waste Management	5	--	--	--
Fundamental Nuclear Science	13	1	5	6
Total	**46**	**10**	**13**	**24**

Program Budget
NERI
($ in Millions)

FY 2002 Appropriation	FY 2003 Request	FY 2004 Request
$31.1[1]	$25.0[2]	$12.0[3]

[1]Includes $9.1 million for I-NERI
[2]Includes $6.8 million for I-NERI
[3]Includes $4.3 million for I-NERI

Visit our web site: *nuclear.gov*